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Knowledge, Attitude, and Practice of Voluntary Blood Donation among Medical Doctors at Muhimbili University of Health and Allied Sciences

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Abstract

Background: In sub-Saharan Africa, the demand for safe blood and blood products exceeds the available supply. Doctors have the potential to become a donor pool that provides regular supply of safe blood and play a positive role in promoting blood donation at the community level.
Broad objective: This study aimed to determine the knowledge, attitude and practice of blood donation among medical doctors at Muhimbili University of Health and Allied Sciences (MUHAS).
Methodology: A descriptive cross-sectional study was conducted from June 2022 to August 2022. The study was conducted at MUHAS, a public university in Dar es Salaam, Tanzania. Using multistage cluster sampling, 140 doctors were recruited. Data collection was done using a well-structured self-administered questionnaire; data on sociodemographic characteristics, knowledge, attitude, and blood donation practice was obtained. Knowledge was assessed using six questions, attitude using five questions, and blood donation practice using six questions. Descriptive statistics were generated using SPSS version 20.
Results: The median age group of respondents was 30 – 39 years. The male-to-female ratio was 2:1. Most respondents had knowledge about the common blood groups (95%), knowledge of transfusion-transmitted Infections (TTIs) was varied i.e., HIV was known to be a TTI by 95%, HBV by 89.3%, HCV by 75%, Malaria by 40.7% and Syphilis by 56.4% and many respondents were not knowledgeable about the specifics of the donation process including the amount of blood drawn (40%) and the recommended frequency of donation (52.1%). The calculated average of correct responses for knowledge of blood donation was 73.2%. Overall, the attitude towards blood donation was positive (95%), and about half of the study participants reported to have donated blood in their lifetime. However, only 2.9% were regular blood donors. Apart from the self-reported claim of being unfit to donate (24.3%), not being approached to donate was the second most common reason given by the non-donors (18.6%).
Conclusion: Our study highlights a discrepancy between having good knowledge and positive attitude towards blood donation, and the actual practice of regular blood donation among medical doctors.
Recommendation: We recommend directing efforts toward understanding of barriers to regular blood donation among doctors and developing strategies to increase donor retention.

Key words: *Blood donation, Doctors, Knowledge, Attitude, Practice, Tanzania.*

Introduction

Safe blood is a critically needed resource in healthcare systems worldwide. When performed appropriately, blood transfusion is a lifesaving intervention. In sub-Saharan African countries, published data on the clinical use of blood and blood products remain limited. However, available estimates suggest that approximately 80% of all transfusions in the region are administered for three major conditions: severe malaria, obstetric hemorrhage, and trauma (1).

In Tanzania, a survey conducted by the National Blood Transfusion Services (NBTS) reported that among 278,371 requests for blood and blood components, 31.2% originated from adult medical units, 26.8% from pediatric medical units, and 20.6% from obstetric units. These findings highlight the high prevalence of severe anemia in both adult and pediatric populations, as well as significant obstetric complications, including maternal hemorrhage, driving transfusion needs (2).

Although extensive and promising research is ongoing, a true substitute for blood and its components is unlikely to become available for many years. Consequently, the availability of blood remains entirely dependent on human donation, whether through voluntary, family replacement, or paid donations (3).

The World Health Organization (WHO) recommends that all blood donations be obtained from voluntary, non-remunerated donors, as they pose the lowest risk for transfusion-transmissible infections (TTIs) and help ensure a safer, more sustainable blood supply (4). Maintaining a stable pool of regular, voluntary, and unpaid blood donors is essential to achieving an adequate and reliable supply of safe blood. In high-income countries (HICs), this goal is largely achieved, with approximately 99% to 100% of the blood supply derived from voluntary donors. Family replacement and paid donations are virtually non-existent in these settings due to strong regulatory frameworks and well-established donor recruitment systems (5). In contrast, low- and middle-income countries (LMICs) continue to rely significantly on alternative sources, with voluntary donations accounting for only about 60% to 70% of the blood supply, while 30% to 40% comes from family or replacement donors. A small proportion, typically 1% to 5%, may still originate from paid donors in regions facing acute shortages. This disparity reflects differences in infrastructure, public awareness, and investment in national blood transfusion services (6).

In Tanzania, voluntary blood donation accounts for approximately 60% to 70% of all blood collections, a level that is notably higher than in many other sub-Saharan African countries (2,6). While this represents significant progress, additional efforts are needed to identify and recruit low-risk donor populations who can become regular, safe blood donors. Such initiatives are essential to achieving the WHO's recommendation of 100% voluntary blood donation (7).

Healthcare workers, especially doctors, represent a potential low-risk donor group that could be strategically targeted in blood donor recruitment efforts (8). Due to their medical training and understanding of the importance and benefits of voluntary blood donation, they are potentially more likely to engage in such altruistic practices (9). They can serve as a

readily accessible source of voluntary blood donors within hospitals, helping to alleviate shortages of blood and blood products. Moreover, through leading by example, doctors can inspire and encourage other healthy individuals to become regular voluntary donors, thereby contributing significantly to narrowing the gap between blood supply and demand. Hence, this study was conducted to assess the knowledge, attitudes, and practices related to blood donation among doctors at Muhimbili University of Health and Allied Sciences (MUHAS).

Methodology

Study design and Settings

A descriptive cross-sectional study was conducted at Muhimbili University of Health and Allied Sciences (MUHAS). MUHAS is Tanzania's leading public institution for training professionals in health and allied sciences. It was officially established as a university in 2007, evolving from its origins as the Dar es Salaam School of Medicine founded in 1963. The University comprises the College of Medicine, and the Schools of Pharmacy, Dentistry, Nursing, and Public Health & Social Sciences, as well as two institutes focused on Allied Health Sciences and Traditional Medicine. MUHAS offers about 90 academic programs spanning diploma, undergraduate, postgraduate, and doctoral level degrees. The University hosts approximately 4,400 students, with 600 to 700 enrolled in postgraduate studies, of whom an estimated 50 to 60% are in medical (or clinical) fields. MUHAS employs approximately 306 academic staff members, with clinical sciences accounting for the largest share at about 51%, followed by basic sciences at 27% and public health faculty at 21%.

Study Population

Faculty members and postgraduate students holding medical degrees were recruited between June and August 2022. Eligible participants were medical doctors at MUHAS, including faculty and postgraduate students, who have previously worked and/or are working in the medical field as doctors.

Sample size estimation and sampling strategy

The sample size of 141 was calculated based on Cochran's formula, at the confidence interval of 95%, margin of error of 5%, and prevalence, p of 89.8% (10).

For appropriate representativeness of the variety of doctors' specializations, a multistage cluster sampling technique was used. From a list of 15 clinical departments at MUHAS, 8 departments were selected purposively, and from each department, participants were recruited consecutively, subject to their availability and the department size, until the desired sample size was met. The departments selected (and number of participants recruited) were: Emergency Medicine (23), Anaesthesiology (25), Otorhinolaryngology (19), Internal Medicine (17), Obstetrics and Gynaecology (21), Paediatrics and Child Health (20), Psychiatry (7), and Radiology (8).

Data Collection

The data collection tool was developed by adapting items from previously published, piloted, and validated surveys of knowledge, attitude, and practice of blood donation from comparable population settings (3, 11). The adapted questionnaire was reviewed by a public

health researcher to ensure content validity and was pretested with two individuals from the target population to verify the clarity of the questions. The self-administered questionnaire gathered information on sociodemographic characteristics of the participants and assessed their knowledge, attitude, and practice on blood donation. There was a total of nine questions on the knowledge of blood donation; three questions checked for participants' general awareness of common blood groups and their own blood group, and six tested their factual understanding of blood donation volume, frequency, duration, eligibility, possibility of infection transmission through transfusion, and specific infections that can be transmitted. For each of the six factual questions, the percentage of participants who answered correctly and incorrectly was calculated and reported. Attitude was assessed using five questions, and blood donation practice using six questions.

Data management and analysis

The Statistical Package for the Social Sciences (SPSS) software version 20.0 was used for data entry and analysis. Descriptive statistics were summarized and presented using frequency tables and a pie chart.

Ethical considerations

Ethical approval was obtained from the MUHAS Institutional Review Board, reference number DA.382/298/28K/. After explaining the aims of the study and the benefits, written and informed consents were obtained from all the study participants. To maintain participants' confidentiality, the data were anonymized by using study numbers.

Results

Socio-Demographic Characteristics of Respondents

A total of 140 doctors responded to the questionnaire, giving a response rate of 99.3%. The median age group was 30 – 39 years, and the male-to-female ratio was 2:1. Demographic characteristics of the study participants are summarized in Table 1.

Table 1: Distribution of socio-demographic characteristics of respondents (n=140)

Socio-demographic characteristics	Frequency (%)
Age	
<20 years	1 (0.7)
21-29 years	33 (23.6)
30-39 years	76 (54.3)
40-49 years	25 (17.9)
≥ 50 years	5 (3.6)
Sex	
Male	93 (66.4)
Female	47 (33.6)
Marital status	
Married	84 (60.0)
Single	55 (39.3)
Widowed	1 (0.7)

Work Experience	
1-5 years	72 (51.4)
6-10 years	41 (29.3)
11-15 years	12 (8.6)
16-20 years	9 (6.4)
≥ 20 years	6 (4.3)
Current or previous work setting	
Emergency	30 (21.4)
In-patient wards	59 (42.1)
Operation unit	32 (22.9)
Intensive unit	11 (7.9)
No response	8 (5.7)

Knowledge of blood donation among doctors at MUHAS

On average, 73.2% of respondents' answers to factual knowledge questions about blood donation were correct across all knowledge domains. The majority (95%) of the respondents were aware of their blood group types, as illustrated in Figure 1. However, a significant proportion were not knowledgeable about the specifics of the donation process, including the amount of blood that is usually drawn (40%) and the recommended frequency of donation (52.1%). While general knowledge on the risk of transfusion-transmitted infections (TTIs) was high (97.1%), awareness regarding specific types of TTIs, such as syphilis and malaria, was comparatively lower, at 56.4% and 40.7% respectively. Specific responses to the various questions are shown in figure 1.

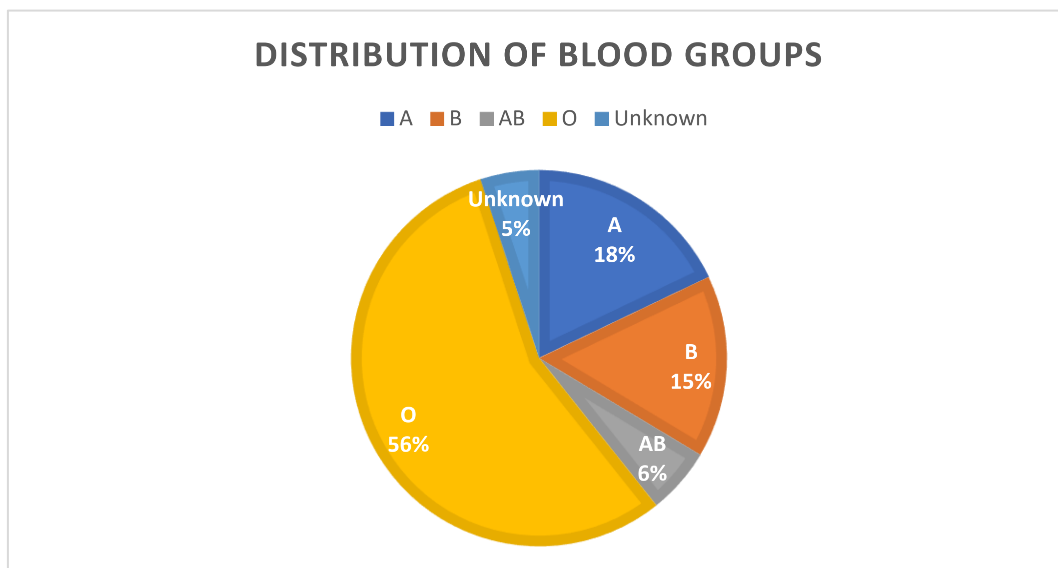

Figure 1. Distribution of the reported blood groups among MUHAS doctors

Table 1: Knowledge of blood donation among MUHAS doctors

Knowledge domain	Question	Response	Frequency (%)	Correct answer
Blood group awareness	Do you know the common blood groups?	Yes No	133 (95.0) 7 (5.0)	-
	Do you know your blood group?	Yes No	133 (95.0) 7 (5.0)	-
Transfusion Transmissible Infections	Can a person be infected by receiving a blood transfusion?	Yes No	136 (97.1) 4 (2.9)	Yes
	What diseases are transmissible by blood transfusion?	HIV HBV HCV Syphilis Malaria	133 (95.0) 125 (89.3) 105 (75) 79 (56.4) 57 (40.7)	All: HIV, HBV, HCV, Syphilis, Malaria
Blood donation frequency	How often can an individual donate?	Monthly 3 Monthly 6 Monthly Annually Don't know	2 (1.4) 67 (47.9) 41 (29.3) 6 (4.3) 24 (17.1)	3 monthly
Blood donation eligibility	Who should donate blood?	Women (correct) Men (correct) Young <18 yrs Old > 60 yrs Less than 50kg Healthy Diseased	87 (62.1) 91 (65) 8 (5.7) 2 (1.4) 4 (2.9) 131 (93.6) 3 (2.1)	Healthy, women and men
Volume of blood donated per donation	What volume of blood is collected during each donation?	Less than 500 mls 500-1000 mls Don't know	84 (60.0) 48 (34.3) 8 (5.7)	Less than 500 mls
Blood donation duration	What is the duration of a donation process?	Less than 20 mins 20-60 mins Don't know	32 (22.9) 87 (62.1) 21 (15.0)	Less than 20 mins

Attitude of blood donation among doctors at MUHAS

A hundred and thirty-three (95%) respondents had a positive attitude towards blood donation. Most of the study participants, 120 (85.7%) accepted voluntary donation as the best source of blood, and a significant proportion (87.1%) also thought that patients' relatives should be asked to donate blood. Of all the participants, 101 (72.1%) showed concerns about potential harmful consequences of blood donation, including temporary weakness (77.9%) and risk of contracting infections (16.4%), as shown in table 2 below.

Table 2: Attitude of blood donation among doctors

Question	Response	Frequency (%)
What do you think about blood donation?	Good	133 (95.0)
	Bad	0 (0.0)
	Neutral	7 (5.0)
What do you think is the best source of blood donors?	Voluntary donor	120 (85.7)
	Replacement donor	6 (4.3)
	Remunerated donor	3 (2.1)
	Self-donor	11 (7.9)
Can something harmful happen to a blood donor during or after donation?	Yes	101 (72.1)
	No	27 (19.3)
	I don't know	12 (8.6)
What can happen to a blood donor during or after donation?	Contract infection	23 (16.4)
	Temporary weakness	113 (80.7)
	No response	4 (2.9)
Should patient relatives be asked to donate?	Yes	122 (87.1)
	No	6 (4.3)
	I don't know	12 (8.6)

Practice of blood donation among doctors at MUHAS

When it came to the actual practice of blood donation, half (70/140) of the participants reported having donated blood in the past, of which 78.6% (55/70) donated voluntarily. Regular blood donation was rare, reported by only 4/70 (2.9%) participants. Among those who had never donated blood, the most frequently reported reasons included being unfit to donate (24.3%) and not being approached for donation (18.6%). Most (82.1%) respondents expressed willingness to donate if ever invited to donate blood, as shown in table 3.

Table 3: Practice of blood donation among doctors

Questions	Response	Frequency (%)
Have you donated before?	Yes	70 (50.0)
	No	70 (50.0)
Why did you donate?	Moral responsibility / Voluntary	55 (39.3)
	A friend or relative needed blood	12 (8.6)
	To know my screening status	3 (2.1)
	No response	70 (50)

How often do you donate?	<1 time a year	49 (35.0)
	1–3 times a year	17 (12.1)
	>3 times a year	4 (2.9)
	No response	70 (50.0)
Will you donate if called upon or reminded to do so?	Yes	115 (82.1)
	No	25 (17.9)
Reasons for non-donation by nondonors	Not approached to donate	26 (18.6)
	Unfit to donate	34 (24.3)
	Need to donate for friends or relatives in future	4 (2.9)
	Fear of needles	17 (12.1)
	Fear of knowing my status	2 (1.4)
	Donated blood may be sold	3 (2.1)
	No remuneration	18 (12.9)
	No response	42 (30.0)
Do you encourage relatives to donate?	Yes	133 (95.0)
	No	7 (5.0)

Discussion

Doctors can serve as a potential pool of voluntary blood donors that may help to minimize the existing gap between blood demand and supply in Tanzania. We therefore conducted a study to better understand the knowledge, attitude, and practice of voluntary blood donation among doctors at MUHAS.

Knowledge of blood donation

On average, 73.2% of knowledge questions were answered correctly by doctors at MUHAS. Most respondents (95%) were aware of their blood groups and the infection risk that comes with blood transfusion (97.1%). However, a significant proportion of the respondents were not knowledgeable about the volume of blood drawn in one sitting and the recommended frequency of blood donation in a year (52.1% and 40% respectively).

Similar to cross-sectional studies done in universities with teaching hospitals in both Nigeria and Tanzania, knowledge is high regarding donor eligibility and infection risk from donated blood (3, 11). However, the knowledge that syphilis and malaria infections could also be transmitted through a blood transfusion appears to be lacking. Although these TTIs are routinely screened for before transfusion, knowledge of them remains essential for doctors to counsel patients on the associated risks of transfusion. Additional transfusion-transmissible infections, such as Cytomegalovirus (CMV) and Human T-Lymphotropic Virus (HTLV), were not included in our assessment of knowledge regarding the associated risk of infection. Future studies could explore awareness of these infections to better inform training curricula for doctors.

Comparability in knowledge levels found in our study versus other literature could be improved by considering a broader population, accounting for not just doctors but also other health professionals in training, particularly nurses and laboratory personnel with more engagement in the donation-transfusion process.

Attitude and practice of blood donation

There was a significant positive attitude towards blood donation, as the majority (95%) accepted that blood donation is a good practice and that the best source of blood is voluntary donation (85.7%). Additionally, a large number of respondents (87.1%) supported the practice of asking relatives to donate blood. In practice, due to limited blood availability, relatives are usually approached to donate blood for their patients and the wider patient population, resulting in both replacement and voluntary donations, respectively. While relying on patient relatives as volunteers helps maintain blood availability, it also poses challenges due to the potential risk of transfusion-transmissible infections (TTIs) associated with replacement donations (11). Therefore, caution should be exercised when requesting blood donations from relatives, including emphasizing the importance of disclosing any disease status or risky behaviors that could compromise the safety of donated blood. Further research could look into quantifying the prevalence of TTIs in donated blood from patients' relatives to support safe donation practice.

Despite the overall positive attitude towards blood donation, there was a contradiction evident in blood donation practice. This study demonstrates a failure in converting attitudes into practice. Only 50% of the respondents reported having ever donated blood, and only 2.9% of them were regular donors.

This disparity, although present, is seen to be relatively low in similar university and hospital settings in developed countries like the United States (12) and Greece (13), where the donation practice among healthcare workers, although not satisfactory, is still higher than that of many studies done in Asia and Africa. For instance, in Greece, those who had ever donated were 43%, but regular donors were 8.6% (9). However, due to significant differences in health infrastructure, cultural norms, policy frameworks, and population behaviors, the validity of these comparisons is limited, but they provide a useful starting point for exploring factors that contribute to successful blood donation practices.

In a student population in Nigeria, 22.1% of the respondents reported having donated in the past, but only 13.9% were regular donors (3). This suggests that although blood donation practice is generally low in the student population, there is better retention potential for students as regular donors than for doctors.

When it came to reasons for not ever donating blood, being unfit to donate (24.3%), was the leading reason for non-donation, followed by not being approached/asked to donate (18.6%), lack of renumeration (12.9%), and fear of needles (12.1%). Since being unfit to donate was the most predominant reason for non-donation, it is of interest whether participants were truly medically informed that they were unfit to donate. However, given that most of the respondents (66.4%) were males aged between 30 to 39 years (76%), this seems unlikely and warrants a qualitative investigation into how

participants understand and interpret being 'unfit'.

Furthermore, a significant proportion (30%) of non-donors did not specify reasons for not donating blood, further emphasizing the need for qualitative surveys for in-depth analysis of sociocultural factors associated with attitudes and practices of blood donation.

A majority (82.1%) of the respondents claimed to be willing to donate if they were called upon or invited to. This highlights the need to increase blood drive campaigns to increase publicity of the existing demand for blood and blood products and encourage voluntary blood donation.

Almost all doctors reported encouraging relatives to donate. Although necessary, this encouragement would be cemented by the doctors' example. Doctors already serve as exemplary figures in the community; their engagement in blood donation can transform blood donation from a one-time occurrence into a regular and common practice for the community (9). The healthcare system holds a responsibility to reinforce its efforts in sensitizing, encouraging, and educating society about the practice of blood donation.

This study mainly describes the knowledge, attitude, and practice of blood donation among doctors. However, it does not describe the facilitators and barriers associated with blood donation. Hence, it lays the groundwork for future research aimed at addressing gaps in attitude and practice regarding blood donation among doctors. Institutional barriers such as policy and infrastructure may also be worth exploring to inform overall blood donor retention.

Conclusion and recommendations

Knowledge and attitude toward blood donation are generally good among doctors. However, having good knowledge and a positive attitude may not necessarily translate to practice. Our study highlights an existing discrepancy between having good knowledge and a positive attitude towards blood donation and the actual practice of regular blood donation among doctors. These findings highlight the need to further explore and address existing barriers to habitual blood donation among doctors. Integrating blood donation practices into medical training, in addition to theoretical knowledge, may help overcome hesitation and build a culture of regular blood donation. Regular onsite donation drives may also be useful in improving donor retention. Additionally, this study provides a basis for exploring similar barriers among other healthcare providers and finding collective solutions to overcome perceived hesitation towards regular blood donation.

Abbreviations

CMV: Cytomegalovirus
HBV: Hepatitis B Virus
HCV: Hepatitis C Virus
HICL: High Income Countries
HIV" Human Immunodeficiency Virus
HTLV: Human T-Lymphotropic Virus
LMIC: Low- and Middle-Income Countries
MUHAS: Muhimbili University of Health and Allied Sciences
NBTS: National Blood Transfusion Services
SPSS: Statistical Package for the Social Sciences
TTIs: Transfusion Transmissible Infections
WHO: World Health Organization.

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Authors' Contribution

AI developed the proposal, collected the data and drafted the report and manuscript. AN supervised proposal development, data collection, analysis, drafted and reviewed the manuscript.

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References

1 Dhabangi A, Dzik WH, Idro R, John CC, Butler EK, Spijker R, et al. Blood use in sub-Saharan Africa: a systematic review of current data. Transfusion. 2019;59(7):2446-54.
2 Drammeh B, De A, Bock N, Pathak S, Juma A, Kutaga R, et al. Estimating Tanzania's National Met and Unmet Blood Demand From a Survey of a Representative Sample of Hospitals. Transfus Med Rev. 2018;32(1):36-42.
3 Nwogoh B, Aigberadion U, Nwannadi AI. Knowledge, Attitude, and Practice of Voluntary Blood Donation among Healthcare Workers at the University of Benin Teaching Hospital, Benin City, Nigeria. J Blood Transfus. 2013;2013:797830.
4 World Health Organization. Blood donor selection: guidelines on assessing donor suitability for blood donation. Available from: https://www.who.int/publications/i/item/9789241548519
5 Shrivastava SR, Shrivastava PS, Ramasamy J. Thank you for saving my life: Blood donation matters. Journal of Research in Medical Sciences. 2016;21(1):23.
6 Bates I, Manyasi G, Lara AM. Reducing replacement donors in Sub-Saharan Africa: challenges and affordability. Transfusion Medicine. 2007;17(6):434-42.
7 Mremi A, Yahaya JJ, Nyindo M, Mollel E. Transfusion-Transmitted Infections and associated risk factors at the Northern Zone Blood Transfusion Center in Tanzania: A study of blood donors between 2017 and 2019. PLOS ONE. 2021;16(3):e0249061.
8 Chamberland ME, Petersen LR, Munn VP, White CR, Johnson ES, Busch MP, et al. Human immunodeficiency virus infection among health care workers who donate blood. Ann Intern Med. 1994;121(4):269-73.
9 Sousos N, Sfyridou S, Adamidou D, Vyzantiadis TA, Karadosidou M, Filippou A, et al. Non-physician health-care workers and voluntary blood donation: an ambiguous relationship. Transfus Med. 2018;28(3):216-23.
10 Enawgaw B, Yalew A, Shiferaw E. Blood donors' knowledge and attitude towards blood donation at North Gondar district blood bank, Northwest Ethiopia: a cross-sectional study. BMC Research Notes. 2019;12(1):729.
11 Elias E, Mauka W, Philemon RN, Damian DJ, Mahande MJ, Msuya SE. Knowledge, Attitudes, Practices, and Factors Associated with Voluntary Blood Donation among University Students in Kilimanjaro, Tanzania. J Blood Transfus. 2016;2016:8546803.
12 Patel EU, Bloch EM, Grabowski MK, Goel R, Lokhandwala PM, Brunker PAR, et al. Sociodemographic and behavioral characteristics associated with blood donation in the United States: a population-based study. Transfusion. 2019;59(9):2899-907.